

STEREO MOC Status Report  
Time Period: 2017:135 - 2017:141

STEREO Ahead (STA) Status:

1. The following Ground System anomalies/events occurred during this reporting period:

- On day 135, during the DSS-26 support, the command uplink was established late at 2012z due to a power anomaly at the station. SSR pointers were repositioned during the track to minimize data loss. All SSR data was recovered. See DR #G118131 for more information.
- On day 136, during the DSS-14 support, turbo decoder lock was lost briefly at 0248z and 0300z. This anomaly resulted in the loss of five frames of SSR data. See DR #G118137 for more information.
- On day 139, during the DSS-43 support, telemetry lock was lost intermittently between 0617z and 0728z due to heavy rain at the Canberra complex. This anomaly resulted in the loss of 119,135 frames of real-time and SSR data. SSR pointers were repositioned on the next support and all SSR data was recovered. See DR# C112690 for more information.
- On day 139, during the DSS-14 support, turbo decoder lock was lost intermittently between 2024z and 2026z. This anomaly resulted in the loss of seven frames of SSR data.
- On day 140, during the DSS-35 support, BOT was 2.8 hours late as a result of the antenna azimuth tape units failing when water entered the weatherproof shroud. The antenna was eventually declared operational once the leak was sealed and the heads dried. Telemetry was received in the MOC 3.25 hours late at 0530z and SSR pointers repositioned and all SSR data was recovered on the next support. See DR #C112701 for more information.
- On day 140, during the DSS-24 support, turbo decoder lock was lost briefly at 141-0146z. This anomaly resulted in the loss of one frame of SSR data.

2. The following spacecraft/instrument events occurred during this week. The Ahead observatory operated nominally during this week.

- On day 138, the SECCHI instrument reset at 00:58:41z. The SECCHI team reconfigured the instrument to operational mode by 139-0300z. This was the 44<sup>th</sup> reset of SECCHI on the Ahead observatory.
- The average daily science data return for Ahead was 5.9 Gbits during this week.

STEREO Behind (STB) Status:

1. Detailed status of the recovery activities this week to restore operations is listed below.

- None.

2. The Behind loss of communication anomaly occurred on October 1, 2014. Post superior solar conjunction, recovery operations resumed on November 30, 2015. By implementing the NASA Failure Review Board recommendations, the first recovery attempt began with carrier detection by the DSN on August 21<sup>st</sup>, through September 23, 2016. At a spacecraft range of ~2 AU, the observatory was found to be rotating slowly about its principal axis of inertia for which the uncontrolled attitude allowed some solar array input and continuous uplink and downlink communications on the LGA at emergency data rates. Over the next 22 continuous days, significant obstacles to recovery were overcome with a collaborative effort of the JHU/APL engineering team, NASA GSFC, DSN, FDF, SSMO scheduling, and Mission Operations teams. This consisted of:

- Reliably commanding a rotating spacecraft with uncontrolled attitude at a distance of 2 AU
- How to power on the spacecraft that was never designed to be off without collapsing the battery voltage
- Acquiring telemetry at 35 bps from a spacecraft that is rotating with an uncontrolled attitude
- Warming a frozen propulsion subsystem with a degraded battery and limited solar array input with an uncontrolled attitude
- Configuring, loading, and verifying EA, C&DH, and G&C parameters and macros with very limited telemetry

- Conducting an autonomous momentum dump in the blind and transitioning to C&DH standby mode and successfully receiving telemetry on the HGA indicating star tracker lock and decreasing system momentum.

However, system momentum level remained above the threshold for re-establishing attitude control with the reaction wheels. Due to the uncontrolled attitude, communication degraded and the last detection of the carrier was on September 23<sup>rd</sup>.

Behind Observatory Status - From the last telemetry received on September 18<sup>th</sup> and the telemetry assessment review held on February 24<sup>th</sup>, main bus voltage is low, 3 out of 11 battery cells are bypassed, attitude remains uncontrolled, rotating about its principal axis of maximum moment of inertia. While likely all ~42 kg of hydrazine remains and is frozen, both pressure transducers are not functioning. EA mode is enabled and autonomy is disabled. The battery charge rate is C/10. RF is configured for the +Z LGA at emergency data rates and the range of the expected best lock frequency is known. Necessary macro sequences have been tested to allow the peak power tracker in C&DH standby mode to protect the battery. These macro sequences will be loaded to EEPROM when the communications supports longer commands.

Monthly recovery efforts consist of attempting to power on the transmitter for 30 minutes. If no carrier signal is detected, battery recovery operations will commence which consist of repeatedly sweeping a 4 kHz uplink range and sending commands for IEM switched power and PDU 1553 interface bus off. The next recovery tracks are on June 9<sup>th</sup>, 10<sup>th</sup>, and 11<sup>th</sup>.

Recovery planning continues with weekly discussions to refine the plan and procedures for the next recovery attempt this Fall by incorporating recommendations from the BEHIND telemetry assessment review and lessons learned. The next recovery planning meeting is on Thursday, June 1st at 9 AM EDT.